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A CASE OF CEREBRO-SPINAL MENINGITIS, WITH REMARKS.

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THE patient was a boy, 14 years old, tall of his age, and well till January 22d, 1864. He has been healthy and strong for several years. In early childhood he was very subject to attacks of tonsillitis, which were frequently ushered in with convulsions, but left behind no chronic enlargement of the tonsils. He is of a very tranquil temperament. It has been remarked by his teacher that he is decidedly the least "nervous" of his thirty-five pupils.

He returned to his boarding school in Brattleboro' on the 4th of January, after a nearly six weeks vacation spent in Boston. Though a diligent student, his illness, occurring in less than three weeks after his vacation, cannot be attributed to over-study. His dormitory is remarkably well ventilated. Each pupil has a small separate room, with a special window, and partitions which do not ascend to the ceiling. The house is situated on an eminence, about a mile from the village.

The 22d of January being a holiday, the first half of it was spent in skating. No act of imprudence, on that day or previously, can be ascertained. In the afternoon he was chilly, and spent it in shivering over a furnace register. At night his sleep was much disturbed.

The 23d, he had severe frontal and temporal headache, and vomiting, and was seen by Dr. Gale, of Brattleboro', by whom he was directed to take warm diluents; no solid food.

The 24th, the headache continued, without nausea.

The 25th, he appeared to his attendants much better. Still, it was noticed that the face was flushed, and the eyes glistening. In the night, he became delirious and difficult to manage; persisted in repeatedly getting out of bed, and was transferred to a room by himself.

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The 26th, he was found to be in a dangerous state, and I was telegraphed for. I reached him a little before 6, P.M. He was lying upon his left side. His eyes were sunken, dull, and devoid of expression, the pupils being considerably dilated; the lips and teeth were covered with sordes, the tongue with a dirty-white coating. His fauces, tonsils and uvula were more red than natural. There was some dried blood about the nostrils, from slight epistaxis occurring the previous day. His skin was hot and dry. The pulse was 90, soft and full. I will say here that the pulse subsequently varied in strength and rapidity. It was sometimes full, and sometimes strong and hard, and its rate varied from 80 to 120.

The patient's head was constantly drawn back. The muscles of the neck were rigid, tender to the touch, and ached. It was, in consequence, highly painful to him to be raised in bed.

On the nates and elbows were patches of diffused redness, of the color of erythema. In the centre of those on the elbows were uncolored spots of the size of a half-dollar piece, leaving an outer margin of redness, say, an inch and a half wide. Within the area of the spots on the nates, were minute patches where the cuticle looked as if it had been broken, giving, at first, the impression of dried vesicles of herpes. Yet, no herpetic vesicles had been seen. On the loins were two spots (each of the diameter of a ten-cent piece) of this last-mentioned appearance, but without the efforescence. On the outside of one of the knees was a circular patch, the size of a dollar, which looked as if it had been struck with a round nutmeg grater, there being minute, regularly arranged eminences, looking as if drops of blood had escaped and dried there. The *tâche cérébrale* of Rousseau was exceedingly well marked. For example, on drawing the end of the finger across the abdomen, a broad red stripe made its appearance with greater promptness and brilliancy than I ever before met with it. These appearances continued about the same for some three days, and then gradually subsided. The head was somewhat, but not very hot. There was nothing noticeable in the heart and lung sounds. The respiration was tranquil. There was considerable thirst. The bowels were rather confined. The urine was high colored, but not deficient in quantity. There was some, but not great emaciation at this time, nor did it increase till some days subsequently. The nausea had disappeared. The headache was situated in the forehead and temples, and was severe, causing at times exclamations of distress.

The *delirium* was peculiar. On my first approach, and at all other times, he knew me, and others. On being addressed, he answered logically and pertinently; but immediately afterwards he relapsed into his fancies. His imagination kept the room peopled with his teachers and playmates, with whom and for whom, as it were, he carried on conversations, personating now one and then another, questioning and replying in such tones that the individuals

represented were recognized. He imagined the presence of objects that had no existence, often being aware that his mind had deceived him, and speaking of his "optical illusions." He often tried to get out of bed, thinking himself called upon to perform some of the avocations of the school. This delirium continued for about three days and nights, after which it began to decline. There was little or no sleep from the morning of the 25th to the night of the 28th, with the exception of about three hours on the night of the 27th.

The patient had been purged and dry cupped when I saw him. He had had no food, but had been allowed, for drink, water and herb teas. The night of the 26th, the first that I was with him, I tried to vomit him with repeated and full doses of ipecac, but entirely failed, the drug operating as a purgative. I then put him on the use of hydriodate of potassa, in doses of three grains every two hours. Frequent doses of spirits of nitrous ether were also given. The bowels were kept open with Rochelle salts *pro re nata*. Rubefacients were applied to the nape of the neck and spine, and a blister to the upper part of the sternum. Blistering the nucha was avoided, for fear that friction from the patient's tossing about would make a bad sore. The patient was not conscious of the drawing of the blister. A rubber bag filled with ice was applied to the head, but he did not seem to be comforted by it; on the other hand, in his delirium he kept removing it to extract the ice. In fact, no marked or prompt relief followed the use of the above, or any other remedies, in such a way as to point indisputably to any of them as its cause. The treatment was in other respects expectant. Thus, on the night of the 27th, he got two doses, of three grains each, of Dover's powder. At this time, it was, that he first had continuous sleep. It lasted three hours. Again, on the night of the 28th, he was found to have cold extremities, when two doses of whiskey were given. Some four hours sleep followed. His diet was chiefly solution of gum Arabic, which was given *ad libitum*, water freely, and ice frequently. He was also given, once or twice, gruel, and tea with toast.

In the forenoon of each day, the symptoms were less severe than than at other times. Otherwise there were no remissions. From the 22d to the night of the 25th was the period of the formative stage of the disease. From the night of the 25th to the night of the 29th, was the period of the manifestly acute stage.

On the afternoon of the 29th there was an hour when a slow, hard, corded pulse caused some increased apprehension. With that exception, the usual morning amelioration continued into the latter part of the day. On the ensuing night, soon after twelve, the patient passed into a quiet sleep, which continued till morning.

On the morning of the 30th, the improvement continued, and the patient, after waking, soon resumed his sleep, which was quiet and natural, and was evidently not coma. This sleep lasted, with inter-

vals of wakefulness of only a few minutes duration, for three days and nights.

After this, that is, after the 2d of February, he was awake more and more during the day, sleeping well at night. The delirium had disappeared, being, in fact, replaced by the sleep. On awaking out of it, there remained some double vision, and there appeared some intolerance of light. These symptoms soon wore off.

From that time forward, convalescence was steady, but gradual, extreme emaciation and great weakness, however, developing themselves as soon as the active form of the disease had passed off. A little more than four weeks from the commencement of the attack, we were able to remove the patient to Boston, by carrying him in the arms to and from carriages and cars, and stopping one night on the way. About this time a general desquamation of the cuticle was observed.

The patient now, March 6th, between six and seven weeks having elapsed from the commencement of the attack, is able to walk freely about his room, and is clear in his mind, though the attention is easily fatigued. He gains slowly from day to day.

While in attendance on the above patient, I was shown, through the kindness of Dr. Gale, an autopsy of a child some eight years of age, which had presented symptoms corresponding very nearly in character, duration and severity, to those of the above case, except that instead of a natural sleep the patient passed into a state of coma. The autopsy showed extreme turgescence of the vessels, and a generally congested appearance of the membranes and cortical substance of the brain. There was a considerable number of red dots from which blood oozed. At the top of the brain, there was a small spot where there was a doubtful appearance of thickening of the arachnoid. There was also a good deal of serum underneath, and distending, that membrane. There was no increased effusion into the ventricles, and nowhere any pus or lymph.

I was also kindly invited by Dr. Higginson, of Brattleboro', to visit a patient of his, who had been seized with symptoms like those in our case (i. e., headache, nausea, prostration, chilliness and some delirium), though not so well pronounced. He was a vigorous young man, who, the day after he was taken, had been found by Dr. Higginson with a strong pulse, and subjected to a full bleeding. It was the day after that, that I saw him. He was then quite in his right mind, had a full, soft pulse, and was convalescent. He afterwards recovered rapidly.

The three cases above alluded to were by no means the only ones of the kind that came to my knowledge. In Brattleboro', and some of the neighboring towns, there was an *epidemic* of this unwonted disease. It was agreed between Dr. Gale and Dr. Higginson that this epidemic could be clearly traced back only to the 10th of Janu-

ary. There had been two or three obscure cases in the two or three weeks previous to that date, which might or might not have been instances of this epidemic. But the first well-defined case, outside the military hospital, dated from the 10th of January.

Some of the cases were very sudden in their outbreak, and rapid in their fatal termination, the symptoms bursting forth at once, with full violence, and without premonition. For example, a man follows his usual avocations through the day, and is well as usual till nine in the evening. He is then seized with nausea and severe headache. Almost immediately he becomes delirious, in a few hours comatose, and within twelve hours from the onset is dead. Again, a little child of three years, at four in the morning, wakes up well and playful, continues so till 7, A.M., is then stricken down with the acute symptoms, in the afternoon is comatose, and before night is a corpse. In another instance there were two persons in the same family, taken nearly at the same time, and both dying in a day or two.

I now insert a letter from Dr. G. F. Gale, of Brattleboro', giving some statistics of his cases:—

BRATTLEBORO', FEB. 25th, 1864.

DEAR SIR,—Below I will give a few items from my record of cases of cerebro-spinal meningitis. No. of cases, 19: males, 5; females, 14. Deaths, 9; recoveries, 10. Deaths in males, 4; in females, 5. Longest duration of fatal cases, 9 days; shortest duration of fatal cases, 19 hours; average duration of fatal cases, 52 hours. Extremes of age, 3 years to 60; average age, about 16½ years. Spots have appeared in about two thirds of the cases; varying so extremely, in different patients, in size and general appearance, as to seem entirely dissimilar.

I have just returned from my twentieth case. A young man (about 18) was about his work yesterday, went to bed last night with some headache, at midnight vomited, having had chills, severe pain in head and spine. He took a "rum sweat," became delirious and soon comatose. I saw him at five this morning. Coma profound, sterterous breathing, pupils insensible to light, no pulsation at the wrist, no eruption. 11 o'clock, A.M., death seems rapidly approaching. Dark livid spots have appeared on the forehead, back and legs, some of which are four lines in diameter, hard, feeling like a flattened shot under the cuticle. Patient died at 2, P.M.

Sectio Cadaveris.—Appearance of brain and membranes similar to the case you witnessed. Stomach nearly empty, normal. Liver, kidneys and spleen healthy. I examined portions of liver, kidneys and spleen microscopically, because my friend Dr. Phelps (Surgeon of the military hospital) informs me that he finds these organs have undergone fatty degeneration in his cases. I found no such change to have taken place in this case.

An interesting pathological point became manifest by the above
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examination. The mother had previously informed me that the boy fell some fourteen feet (five years since), striking the back of his head upon the barn floor, from which he soon apparently recovered, but after the lapse of three months he commenced having "fits," which have recurred at short intervals (sometimes two or three in a day) up to the time of his death, without much mental injury. I found, in the examination, an old fracture of the right temporal bone, and just at the base of the petrous portion was a point projecting two lines, at least, into the cranial cavity, about which the membranes adhered firmly to the brain. I think that portion of the brain was softer than other portions.

Very respectfully yours,

To L. PARKS, JR., M.D.

GEO. F. GALE.

To sum up; the leading symptoms in this epidemic were, in brief, headache, nausea, a peculiar delirium, frequently eruptions, which, though various, were most often of the character described in the first case above detailed: these symptoms coming on rapidly, sometimes suddenly, running a brief course, and terminating in fatal coma, or in slow convalescence. The pupils in the cases seen early were usually dilated. Later in the course of the disease they were variable in size. One or two other autopsies have been made outside the military hospital, and I am told there was found a similar appearance to what occurred in that I saw and have described.

I now take the liberty of alluding to certain cases of what I presume to be the same disease occurring at about the same time in the military hospital in Brattleboro', under the charge of Dr. Phelps, Surgeon-General of Vermont.* From the description given me by Dr. Phelps, who several times did me the great favor of visiting the case under my charge, in consultation, I gather that the leading symptoms were generally like those in the cases occurring in the neighboring villages. Instead of a mere drawing back of the head, however, there was, in the hospital cases, complete and persistent opisthotonus; and the eruptions, instead of consisting of patches of diffused redness, were generally impetiginous or eczematous. At the autopsies, pus was seen flowing from the spinal canal. The spot where the worst lesions were found was at the top of the cerebrum. Dr. Phelps considered this especially a military disease, and that it affected chiefly new recruits.

It seems to me that our data are insufficient for deciding whether *spotted fever* was or was not an epidemic of the same disease we are describing.

Dr. Phelps, a great many years ago, before he had become conversant with medicine, had an opportunity of seeing a case of *spotted fever* during the epidemic prevalence of that affection, and declares the eruption in that case quite different from any seen in the

* This hospital is situated about a mile outside the village, in a direction opposite to that of the boarding school. The situation is high, and well aired, the barracks of wood, well constructed and arranged.

Brattleboro' epidemic. The symptoms of spotted fever, as given by Drs. Bigelow and Holmes, in their edition of Marshall Hall, are, "sense of lassitude, great prostration, faintness at stomach, sinking of the pulse, coldness of surface, occasionally chills, pain in the head, coma, delirium or convulsions, vomiting, in some instances approaching that of cholera morbus, and the appearance of *petechia* or spots of effused blood beneath the epidermis. This eruption" "was not constant." "Death commonly occurred within twelve, twenty-four or forty-eight hours in the fatal cases. In favorable cases reaction took place, and a mild fever of uncertain duration ensued. *Morbid Anatomy*.—From the necessarily imperfect accounts we have received of *post-mortem* examinations, it appears that little was found beyond congestion in the internal organs, especially in the brain."

We believe that the disease under consideration was not, as has been suggested by some, scarlatina. Our reasons are: 1st, that there has been no evidence of contagion among the cases. My case, it will be remembered, occurred in a school of thirty-five boys, among whom there was no second case. 2dly, the pulse did not present that extreme frequency so characteristic of scarlet fever. 3dly, the throat did not manifest any considerable amount of inflammation. Finally, I am not aware that any of the cases of this disease have been followed by any of the usual sequelæ of scarlet fever.

The principal foundation for the hypothesis of scarlatina, besides the sudden and violent attacks, which are not peculiar to that disease, is, we presume, the red eruption. But, this was not the only form of eruption that occurred, and, when it did appear, it did not occupy the spots which the eruption of scarlet fever chiefly affects; as, for instance, the flexures of the joints. The general desquamation of the cuticle, in my case, was a point of resemblance, though I think of no great significance. Whether or not this occurred in other cases I am unable to say.

The same objection of absence of contagion applies with great force against the theory that the disease was typhus fever. As to the theory of intermittent fever, it is perhaps enough to say that there was no distinct periodicity; and there were no repeated alternations of chills and heat.

I would also submit that it differs from simple acute phrenitis, in that it was asthenic, rather than sthenic; that the delirium was not violent, or even what would be called high, but peculiar, the patient being recalled to himself on being addressed; that, except in the one case mentioned above by Dr. Gale, the usual causes, traumatic and mental, of simple phrenitis were absent.

The impression made upon my own mind is, that the disease is owing to some subtle morbid influence, which is epidemic, and different from those of the diseases with which we usually meet; that influence acting as a poison, so to speak, on the systems of the predispos-

ed, and producing determinations to the brain and sometimes to other internal organs. If any should think to account for the prevalence of the disease in Brattleboro', by the fact of the vicinity of the Connecticut River, it may be replied that, as a matter of fact, the place is proverbially healthy, and that the valley is swept by a dry mountain air. It is possible, however, that the unusual warmth of the present winter may, by enabling the air to suspend a large amount of vapor, have given the river influence an ascendancy over the usual salubrity of the place.

I suspect the term "epidemic," used above, is applicable in a very extended sense. I have read a newspaper account of the prevalence of a so-called "new disease" in one of the rebel States on the Gulf, with a graphic summary of the symptoms, which tallied, in most respects, remarkably with those observed in Brattleboro'.

Furthermore, I find in the able account given last year, in the Boston Medical and Surgical Journal, by Dr. Upham, of "Cases illustrative of the so-called 'Congestive Fever,' or Cerebro-spinal Affection, in the Camps in and around Newbern, N. C.," a sufficient resemblance to the Brattleboro' cases to induce a belief that the two sets were of the same nature.

Dr. Upham says (vol. lxviii., page 314): "In *its mode of attack*, the disease was commonly sudden and without premonition, the patient, for the most part, continuing on duty and making no complaints till the very day of his seizure. Some of the most violent cases thus commenced; Case XII., previously cited, is in point, where the soldier appeared with his company at evening dress parade, complained of chilliness, headache, &c., during the night, and was dead within thirty-six hours following." Page 315, he goes on to say: "The symptoms were, at first, headache, referred oftentimes to the back part of the head particularly, with dizziness—pain in the back and limbs with sometimes rigors, nausea and vomiting. Chilliness, rather than a well-defined chill, characterized the accession of the disease. . . . There was often tenderness at the nape of the neck and along the spine early in the disease. The skin was usually moist, but hot. . . . There was not, for the most part, active delirium, but perversion of intelligence rather, and dulness and indifference to outward objects, *from which condition the patient could be roused and made to answer questions consciously.*" [The Italics are ours.] "The decubitus was mainly on the side, with the head not unfrequently thrown back—the neck rigid and stiff—a partial opisthotonus."

One point of difference deserves notice; there were petechiae in some of Dr. Upham's cases, leading him to suspect or think of typhus: none in the Brattleboro' cases, up to my latest advices. But this sign will perhaps have less weight (at least as a differential symptom) when we consider that in the Brattleboro' cases the eruptions were not constant, or of uniform character, particularly in the military hospital.

I would also remark that in the history of the disease by Valleix, to which I shall presently refer, the eruptions mentioned as occurring differed from each other within a certain range.

The autopsies in the two sets of cases, though differing in the intensity of the pathological changes, were alike in presenting marked traces of inflammation of the encephalon, and in showing a point of election at the top of the cerebrum. Also, the occurrence of fatty degeneration of the liver in one of Dr. Upham's cases falls in with the tendency to that affection alluded to in Dr. Gale's letter, as mentioned by Dr. Phelps.

This disease is very graphically described by Valleix in his "*Guide du Médecin-praticien*" under the name of *méningite cérébro-spinale épidémique*, though M. Valleix doubts any essential difference between this and the sporadic form of cerebro-spinal meningitis. We will quote some of the statements of Valleix on the subject, to show that we have been dealing with the same disease he describes under the above heading, and to confirm some of our positions.

The disease (*méningite cérébro-spinale épidémique*), says M. Valleix, made its invasion into France, not long before the year 1839; and showed itself first at Bayonne, Newbonne, Foix, Bordeaux. In 1839, it reigned at Rochefort, and almost exclusively in the prison. It was, then, at first taken for typhus, but afterwards recognized as epidemic cerebro-spinal meningitis. Subsequently, it raged in divers localities in France, amongst which were Strasburg, Versailles, Lyons. An account, by Dr. Robert Mayne, of this affection, as it appeared in Ireland, is referred to. The disease is designated by Dr. Mayne as *cerebro-spinal arachnitis*; and we think this fact quite to the point, as in Ireland typhus is, as it were, indigenous, and its characteristics so familiar, that it would seem the disease in question must have been recognized as typhus, unless there were valid reasons for considering it something else.

M. Tourdes is quoted as having endeavored to prove the antiquity of the disease, but, according to Valleix, with doubtful success.

As to the predisposing causes, M. Valleix remarks: "To say that in France the epidemics have shown themselves among soldiers, and principally among new recruits, amounts to saying that cerebro-spinal meningitis has raged among adults, and those towards the ages of from twenty to thirty years. At Rochefort, however, the affection attacked, in the prison (*bagné*), principally middle-aged subjects, and, in the town, it raged most among individuals less than twenty years old. In Ireland it was otherwise. It results, in fact, from the researches of Dr. Mayne, that the affection showed itself almost exclusively in subjects under twelve years. But it did not appear with nearly so great frequency in children under seven, as in the period from seven to twelve years."

"The remark which I have just made," he goes on to say, "proves that the affection prevailed *almost exclusively among the male sex*.

This corresponds with what M. Lefevre has established in a conclusive manner, since in the town of Rochefort, females were attacked in a minimum proportion. In Ireland the malady showed itself almost exclusively among boys."

In this matter of sex as a predisposing cause, the statistics of my friend Dr. Gale are different, since among the cases he happened to see there were 6 males and 14 females.

In no locality, says our author, has contagion been proved to exist.

The same sudden outbreak of the disease is noticed as sometimes occurring, which was observed at Brattleboro' and at Newbern.

The peculiar type of the delirium is specially mentioned, as follows:—"At first, the *delirium* is ordinarily quite easily dissipated by direct questions. That is to say, in replying, the patient seems to come out of a dream, into which he quickly relapses, as soon as you cease to interrogate him. Later, in the disease, it is more difficult to obtain responses, and when they are made they are often inchoherent and wide of the mark."

Valleix mentions the frequency of what he calls tetanic stiffness of the posterior portion of the trunk, the head being drawn backwards, the spine greatly bent.

Our author mentions as remarkable the frequency of certain cutaneous eruptions described by different observers. He cites M. Lefevre as speaking of impetiginous eruptions; and M. Faure-Villar as having seen spots of a deep brown, or a bright purple, not disappearing under pressure, and not elevated above the surface; sometimes, ill-defined patches of an inky black hue, at other times spots similar to those of scarlatina, or else a red miliary eruption. The latter author mentions a vesicular eruption on the lips. M. Tourdes observed herpes labialis in two thirds of his cases. He also saw rose spots, but only seven times out of ninety-nine cases. Valleix remarks that this last fact confirms what he had observed previously, that rose spots, without belonging exclusively to typhoid fever, are met with in that disease in an infinitely greater proportion than in any other. M. Tourdes found *petechia* but three times.

The duration of the disease is stated as varying from twenty hours to eighty, ninety and one hundred days, the average being fifteen days for the fatal cases, and twenty-five days for those which recovered.

In an epidemic observed by Lefevre, the mortality rated at four fifths during the first part of the epidemic, and at two thirds when it had lost somewhat of its intensity.

Among the post-mortem appearances, all mentioned injection of the cerebro-spinal membranes, increased serosity; or, on the contrary, dryness, false membranes, and pus. The cerebral and spinal substance was found injected, sometimes softened.

Among the remedial measures resorted to, M. Valleix mentions bleeding, which has been tried to a great extent, and with results

less satisfactory to his criticism than to some of those who have used it. Cold applications to the head have rather disappointed the expectations which have been formed of them. Results have not been in favor of mercurials. Blisters have been largely used, but no evident advantage resulted from them. On the contrary, they often augmented the suffering of the patient without ameliorating any symptom. Sulphate of quinine has been tried, but, given for the purpose of conquering the affection itself, it has had no real success. Administered during convalescence, however, with a view to rouse the appetite and hasten the recovery of strength, it has been of considerable utility.

One remedy alone M. Valleix feels authorized specially to recommend, and that is one which practitioners have been timid in using in inflammations of the brain, viz., Opium. He says, opium in large doses is the only remedy which has been administered with any confidence, and which appeared to exert any real influence over the disease. The dose of the drug which has been employed with apparent success, is *two or three décigrammes and sometimes more* in twenty-four hours; the décigramme being equal to 1,544 grains, Troy weight.

Inhalation of ether has been used with apparent benefit, and deserves further trial.

For my own part, if I were to have other cases of this disease to treat, I should use opium in a tentative manner, without beginning, however, by *cannonading* my patient with it, and yet avoiding the administration of it in so small a dose as to excite, without quieting.

As to bleeding, if the case seemed to indicate it by the pulse, temperament, &c., I should not be inclined to entirely reject it. The local abstraction of blood by leeches or cupping I should hesitate still less to try. But I should not go to the extent of *fifty or a hundred leeches*, as was done by M. Tourdes. Still, I should watch more intently to see if there might not be a chance to give beef tea, and even stimulants; and this for the reason of the asthenic aspect of the malady.

Not neglecting the employment of hydriodate of potassa in large doses, my treatment in other respects would be carefully expectant.

THE FORMATION OF CRYSTALS OF PHOSPHATE OF LIME AND MAGNESIA UPON THE INTESTINAL MUCOUS MEMBRANE.

By FRANÇOIS H. A. LARUE, PROFESSEUR DE MÉDECINE LEGALE DE L'UNIVERSITÉ LAVAL, QUÉBEC.

[Communicated for the *Boston Medical and Surgical Journal*.]

ON the 1st of February, 1864, I was requested by the Coroner of Quebec to make a *post-mortem* examination of a woman who had been buried two months and some days, and with regard to whose death

there had arisen suspicions of poisoning. The body, although putrefaction had already set in, was, considering the time that had elapsed since death, in a tolerable state of preservation. The skin was of a dark-blue color, and the epidermis came off on pressure of the finger.

On opening the stomach, I found a few ounces of a darkish fluid, which I put aside for analysis. Passing my fingers over the mucous membrane, I felt small, hard bodies, which, when taken off and allowed to dry, had the appearance of small crystals of a yellowish-white color. Having some months previously examined the body of a person who had been poisoned by arsenic, I was so much struck by the resemblance of the crystals before me with those found on that occasion, that I felt almost convinced that I had to deal with another case of arsenical poisoning. I accordingly brought the large and small intestines and liver to Quebec for further examination.

The day after my arrival, I proceeded to test the crystals for arsenic by the method of reduction, by sulphuretted hydrogen, &c.; but, to my great surprise, the result was purely negative. I then tried, by Reinsch's method, a little of the liquid contained in the stomach; but the copper leaf, after having remained in it for an hour, was withdrawn as clear and bright as when it was introduced. Thus convinced of the absence of arsenic, I next proceeded to examine the intestinal tube. The stomach and duodenum did not present, either internally or externally, any trace of inflammation. To appreciate, however, the morbid phenomena presented by the several organs, we must bear in mind how long a time had elapsed since death, and also that putrefaction, while it at times simulates these phenomena, at other times causes them to disappear. The mucous membrane of the remainder of the small and of the large intestines was manifestly very much reddened, but only in patches. I had found an *ascaris lumbricoides* in the stomach. I found another in the duodenum, four in the cæcum, and two in the colon. The whole of the mucous membrane of the small and large intestines was found lined with hundreds and hundreds of small white crystals, similar to those found in the stomach. The largest of these crystals might be about twice the size of a pin's head, and were found in greater number by far in the large than in the small intestines. Some floated freely in the intestinal liquid, but a great number, having very sharp angles, were so embedded in the mucous membrane as to be withdrawn with difficulty—sometimes even causing the membrane itself to be torn before they could be extracted. The red patches, to which I alluded above, always corresponded to those parts where the masses of crystals were found.

In the cæcum, besides the four worms, I also found three small pieces of bone, each the size of a small nut. One of these bones belonged to the compact, the other to the cancellated portion of bony tissue.

After this examination, I continued my chemical researches, and proceeded to test the crystals for several other poisons, but always with negative results. I then asked myself if possibly I had not to do with one of those rare cases mentioned by toxicologists, where crystals, described as being composed of ammonio-phosphate of magnesia, have been found after death, and are generally considered to be the result of putrefaction, and which so much resemble crystals of arsenious acid, that Christison, among others, was in two cases only convinced of their real composition by analyzing them. I therefore directed my researches towards this point. The crystals thus far not having appeared sensibly soluble in boiling water, I treated them with dilute nitric acid. They dissolved immediately, with the exception of a white flocculent substance, which floated in the liquid solution and resembled grease. This acid solution was filtered and divided into two parts. The first, acted on by ammonio-nitrate of silver, showed the presence of phosphoric acid; the second, treated by the appropriate tests, showed the presence of lime and magnesia.

Wishing to make sure of the composition of this white flocculent substance that had not been acted on by nitric acid, I bruised one of the crystals, which was quite unctuous to the touch, and which, submitted to a microscopical examination, presented to my view the fine tables of cholesterine. The crystals were thus composed of phosphate of lime and magnesia, and cholesterine.

Now, were these crystals, as most writers have considered, the result of putrefaction? I think not. It is true that the phosphate of lime and of magnesia is naturally found in milk and other nutritive substances, such as wheat, peas, beans, &c. It is also true that this salt is nearly always found in the faeces of healthy individuals. But evidently there is no proportion between the quantity of this salt contained in articles of diet and the thousands of small crystals found in this case.

From whence, then, did they arise? Believing that I have here found nature at work, and so discovered their origin, I am led to hope that this communication may not be unimportant. Thus, I mentioned above that I had found three pieces of bone in the cæcum, each the size of a small nut. One of these pieces, formed of the compact portion, was perfectly intact; the two others, on the contrary, belonging to the cancellated portion, seemed corroded, and we could plainly see a portion of their tissue converted into small white crystals, exactly similar to those found in the course of the intestines. When we consider that all the elements of which these small crystals were formed are found in the bones (with the exception of cholesterine, which was evidently there in a mixed state), we cannot but conclude that they were (in the case before us) but a transformation of the osseous substance itself—a transformation effected by the efforts of digestion.

With regard to the effect produced on the intestinal mucous mem-
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brane by the presence of these small extraneous bodies, which not only acted by contact, but further by their angles embedded in the membrane, there can be no doubt but that enteritis or gastro-enteritis must be the result.

During her illness, which lasted thirty-six hours, the deceased had most of the symptoms of such disease, viz., vomiting, constipation, abdominal pain, &c.

Then, as to its being a case of poisoning, it was impossible to entertain the suspicion, on analyzing the evidence, and considering the development of the symptoms. Moreover, a general analysis of the liquids of the stomach had already convinced me of the absence of all metallic substances, with the exception of a certain quantity of iron, which is so frequently found in the stomach accidentally.

What conclusions are we to draw from these observations? I think we may safely conclude:

1st. That the presence in the stomach of small pieces of bone, gives rise, in certain cases, by the effects of digestion, to the formation of those small insoluble crystals, which up to the present time have been generally attributed to putrefaction, and which, by their presence, cause enteritis or gastro-enteritis. We would thus have a new cause of enteritis or gastro-enteritis quite unknown, I believe, up to the present day.

2d. That this cause of sickness is probably more frequent than we suspect, considering that many persons are in the habit, while eating, of cranching bones and swallowing them.

3d. That an unhealthy state of the stomach or intestines has probably something to do with this transformation, inasmuch as many persons have swallowed bones without experiencing any bad effects. In this case the deceased had eight ascarides lumbricoïdes, and had suffered some time previously from intense colic.

4th. That if, after examination of a patient, enteritis should be diagnosticated, due to this cause, the treatment would be very simple. By administering to the patient a nitric acid lemonade, both by the mouth and by the rectum, an immediate solution of the crystals would be effected.

Quebec, March 5th, 1864.

THE BOSTON MEDICAL AND SURGICAL JOURNAL.

BOSTON: THURSDAY, MARCH 24, 1864.

THE CAUSES OF MENTAL DISEASE. DR. RAY'S ANNUAL REPORT OF THE BUTLER HOSPITAL FOR THE INSANE.—The Annual Report of the distinguished Superintendent of the Butler Asylum for the Insane, Dr. Isaac Ray, comes to us this year with unusual interest, from the fact that the previous high authority of the author has been so much

strengthened and extended within a few months by the publication of his excellent treatise on Mental Hygiene. The community are ready to receive anything which comes from his pen on this momentous subject as bearing the impress of a master hand, and worthy the most respectful consideration. It is therefore with special satisfaction that we find, on opening his report for the past year, that it is devoted to the discussion of one of the most difficult subjects in this department of mental science, namely, the causes of insanity. Avoiding the commonplaces which are so apt to make up a large portion of these annual reports, after giving the necessary statistical history of the institution under his charge during the year, Dr. Ray proceeds at once to take up this subject.

He advertises to the somewhat common feeling of surprise that there has been so little increase of insanity attributable to the war now raging within our borders. Common opinion has taken it for granted that the losses and sufferings, the griefs and the trials which press with increasing weight upon our people, must bear an immediate fruit of shattered or shaken intellects. Strange as it will appear to most people, the event has not accorded with this apprehension. We believe that Dr. Ray's experience in this respect is fully sustained by that of the officers of other asylums for the insane. Dr. Ray is persuaded, nevertheless, that this bitter fruit of this unhappy warfare is only ripening the more slowly, and is sure in the end to distress us with its unwelcome flavor. The error of the popular anticipation, in his estimation, lies in a widely received and erroneous opinion, entertained as well by the medical profession as by the public at large, that the causes of insanity generally lie upon the surface and can be easily detected. The *post hoc ergo propter hoc* reasoning, so common in matters purely physical and material, Dr. Ray considers to have entered quite as largely into these metaphysical questions, and with as little wisdom. "All our knowledge of morbid action," he says, "warrants us in believing that the deteriorating influences of this great struggle upon the qualities of the brain will be witnessed not so much in the present as in the next generation." And further on, "briefly speaking, the mistake consisted in supposing that insanity is generally the effect of some profound emotion, or serious bodily ailment, overlooking those organic conditions from which chiefly those events derive their power to harm." And this opens at once the question, how are mental disorders produced?

In his usual, attractive and lucid style, Dr. Ray proceeds to treat of the common tendency, above alluded to, to ascribe mental disorders at once to some marked occurrence, probably the most recent of any importance in the history of the patient, as the cause of the attack. We cannot follow him, but must refer our readers to the report itself, which any analysis can hardly render justice to. After showing how very difficult the solution of this question must be in the nature of things, where so much must depend on the unseen and unknown inner life of the patient, he gives us a leaf from his own experience, as follows:—

"Admitting that the antecedents are thoroughly understood, if it were possible, it would be quite beyond our power to measure the amount of agency exerted by one and another in the production of the disease. The great misfortune, the terrible affliction, the stunning blow, may have had less to do with the final result,

than some trouble concealed from the common gaze, deep in the inmost recesses of the inner life. On conversing with those who have recovered from an attack respecting the incidents which led to it, I have found, oftener than otherwise, that they laid far less stress on the prominent event which had been fixed upon by others as the source of the evil, than on something so slight, apparently, as to have escaped the notice of the most intimate friend. In my observation of insanity, nothing has surprised me more than such revelations of mental experience, completely upsetting, as they did, our own elaborate conclusions respecting the cause of the disease. Not that the revelations of those who have been insane are always reliable, even if they have perfectly recovered, for the very disturbance of mind must necessarily prevent them from reasoning or even remembering correctly about their mental impressions while under the influence of disease; yet, after all due allowance is made, their conclusions may not be more liable to error than those of outside observers. But well as we may understand these incidents which are obvious to the senses, we can seldom, if ever, be sure that the morbid agency has been exerted by them rather than by those mysterious conditions of the cerebral organism which are indicative of imperfection or tendency to disease, and derived, in the process of generation, from imperfections in the parent or ancestor."

Speaking of the tables of causes so common in hospital reports, where *hard work*, *fear of poverty*, *jealousy*, and other supposed causes are duly given to make up the annual sum of statistics, he discredits them all, and looking at them as far as possible with a fresh eye, he says:—

"We shall scarcely find any warrant, I think, for believing that the incidents here named can, in the nature of things, exert a morbid effect on the brain. A poor man can have no apprehension of poverty, while, in the rich, it must be a morbid feeling, of course—part and parcel of the disease of which it is alleged to be the cause. Jealousy, in process of time, gradually increasing, may become a form of mental disease; but to call it the cause of insanity is very like saying that it is the cause of itself. Hard work may produce that exhaustion of the vital energies which favors the development of insanity, but directly it cannot injure the brain."

What, then, is the cause? How shall we get at the truth in this abstruse question? And here, again, the more profoundly we think, the more difficult and hidden does its solution become. Nothing less than the long antecedent history of the secret consciousness of the man would seem to furnish reliable data for it. And yet in drawing up the statistics of causes, the physician has very often only the reports of persons of the lowest culture, the immediate friends of the patient, utterly incapable of a philosophical induction, to go upon. The mistakes to which this may lead he points out in the following passage:—

"Prominent among the antecedents of a case is drunkenness, for instance, and an incautious observer would straightway pronounce it the cause of the attack. That insanity may sometimes be fairly attributed to drunkenness, cannot be doubted; but, considering the nature of maniacal impulses, and the abundant opportunities for indulgence, there is always reason to suspect that, under the circumstances supposed, the vice may be an effect rather than a cause; and farther inquiry often confirms the suspicion. Again, a person is found to have avoided society, to have shut himself up in his own home, and thus for years dwelt only with himself—eating his own heart, as old Burton has it—and when, at last, he becomes unequivocally insane, his misfortune is attributed to *love of solitude*. Another, while correctly performing all the duties of his lot, fears that he will eventually come to want, though with enough at present, and with prospects that forbid any reasonable anxiety. He is frugal to meanness, denies himself and family the comforts suitable to their station, and acts as if the poorhouse were ever

looming up in the future. After years of such mental experience, every incident becoming gradually intensified, he is pronounced insane, and his case is duly chronicled as produced by *fear of poverty*. Now, in cases like these—and they might be multiplied ad infinitum—it often needs only a thorough knowledge of the mental history of the individual, to find conclusive proof that the drinking, the love of solitude, the fear of poverty, &c., merely masks less obvious steps in the progress of that morbid process which finally ends in overt insanity.

"When the prominent events are many and nearly contemporary, the difficulty is scarcely less. By one friend the attack is attributed, for instance, to the trials of an arduous and highly responsible business. Another attributes it to the loss of a dearly beloved associate; while still another, better acquainted with the patient's private history, is quite sure that he owes his misfortune to fast living. According as we consult one or another of these friends, we shall set down the cause of the disease as application to business, or death of a companion, or intemperance. And yet, any one of these incidents, calculated though they all are to derange the health of the mind, might have been completely harmless in the present instance. The business, though arduous and perplexing, might not have been beyond an easy stretch of the mental powers. The emotion caused by the deep affliction might have subsided under the influence of time or the pressure of duties; and the manner of life, though not conducive to longevity or good health, might have been borne by the help of a good constitution. It is all a matter of conjecture, and conjecture is no foundation for a scientific conclusion. So that, at last, with all the information within reach, the question to be settled is, not which of these events was the cause of the disease, but whether any one of them was concerned in its production."

The gradually increasing ratio of the cases attributable to unknown causes, in the tables of assigned causes (now half or more of the whole number), shows that the force of Dr. Ray's convictions is steadily acting upon other minds as well as his own.

In attempting to solve the great difficulty under consideration, Dr. Ray goes on to discuss the important question of hereditary transmission. This is with him the main secret of mental disease—a predisposition born into the unfortunate sufferer, the woful legacy from a progenitor, immediate or remote. He argues this point with great force; illustrating it by the known facts of the transmission of physical defects or peculiarities in man and the lower animals, as well as by the unquestioned hereditability of many bodily diseases. Want of space prevents our more than alluding to this interesting part of his essay. The conclusion to which he is led is—

"That in the production of insanity there is generally the concurrence of two classes of agencies, one consisting in some congenital imperfection of the brain, and the other in accidental, outward events. I do not say that mental disease is never produced by the latter class of agencies exclusively. The present limited state of our knowledge forbids so sweeping a conclusion. Cases sometimes occur where the closest investigation discloses, apparently, no cause of cerebral disorder within the patient himself. There is good reason to believe that the number of such cases would be lessened by a deeper insight into the inner life and a minuter knowledge of those organic movements which lead to disease. We know that even in those cases in which, to all appearance, the casual incident was most competent of itself to produce the disease, the constitutional infirmity may be often discovered. Drunkenness, epilepsy, blows on the head, sun-stroke, would seem capable, if anything outward could, of producing insanity; but as a matter of fact, we find, not unfrequently, behind these casual events, firmly seated in the inmost constitution of the brain, the hereditary infirmity. Can we believe that it took no part in the morbid process?"

Sad and almost disheartening as this view appears at first sight, Dr. Ray does not find it so discouraging on closer inspection. He does

not believe that it must of necessity cast the blighting shadow of an unavoidable fatalism over the life of the unfortunate inheritor of such a tendency. On the contrary, he believes that the dreaded fate may be the oftener averted by calmly recognizing the truth in this matter. That "the peril being understood, it may be kept in abeyance by avoiding all those incidents and influences which are calculated to bring it into active operation, and faithfully complying with the proper rules of living."

From this great truth of the hereditary transmission of the tendency to insanity, Dr. Ray draws in conclusion a lesson of charity in judging of the peculiarities or foibles of our fellow-men; seeing from his point of view, in many disagreeable traits of character or propensities to vice, rather an inherited weakness, to be dealt with in all Christian kindness, than a moral obliquity for which the individual is accountable, and to be met with stern indignation.

We cannot forbear adding one word, in conclusion, with reference to the commonly received causes of insanity, and the statistics based upon them. It appears by Dr. Ray's own showing, that there are agencies which should be recognized as *exciting* causes, even if they are not the fundamental cause. These exciting causes, it is true, may be very difficult to detect, but they are none the less important subjects of inquiry, and, when faithfully traced, must be of great statistical value. So far, then, as his remarks on this subject serve to point out how they are to be sought for, we fully agree with him; but when discovered they must be of great practical importance in carrying out Dr. Ray's own views of the method of counteracting the original tendency to mental disorder. Such tables, then, of *exciting* causes, we are not yet prepared to discard as wholly unphilosophical and worthless.

ANNUAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION.—We would call the attention of our readers to the announcement in this week's JOURNAL of the approaching annual meeting of the American Medical Association, to be held in New York, commencing Tuesday, June 7th, 1864. There is every inducement to the profession to be well represented on this interesting occasion. The various medical organizations throughout the country, entitled to be represented, will, we hope, make timely preparation for it by the choice of delegates. We hope that the hospitals, as well as the medical schools and the Army and Navy, may send delegates the present year. There never has been a time since the organization of the Association likely to be so productive of direct, practical good to the profession as the present occasion offers. The many great questions of military hygiene and the treatment of the diseases to which our armies are liable, unite thousands of our brethren on topics of common interest; and the opportunity for conference and discussion afforded by this meeting cannot fail to be thus directly beneficial to the whole country. Due pains should be taken by the various bodies sending delegates to observe the proper forms in commissioning them, so that no one may be discredited for want of a regular certificate. A list of the delegates should also be sent, in all instances, to some one of the committee of arrangements. We would also take the liberty of reminding the

members of the several committees, standing and special, of the importance of having their reports ready at the appointed time. We hope we shall not have occasion the present year to record of any of these committees the unsatisfactory result—unprepared to report. We trust that both for the reputation of our common profession as well as of our common country, the members of the Association will make a special effort at the present time, that the world may see that the interests of our noble calling are still watched over and sustained, notwithstanding the storm-clouds of war which envelope us.

USE AND ABUSE OF STIMULANTS IN FEVER—OCCASIONAL ANTIPIHLOGISTIC TREATMENT.—A few days ago we saw at Guy's several patients convalescent from fever. In reference to them, Dr. Wilks remarked on the treatment of fever by stimulants. A young man, who had had typhus fever, and who had been covered with the ordinary mulberry rash, had recovered without any. As there appeared no need to give any, Dr. Wilks wished to prove to his class that alcohol was not always necessary in fever, and that he did not by any means consider alcohol as an antidote to fever, for he found the disease always ran its course under every form of treatment. He considered the rule laid down by many of the older physicians to be the correct one with regard to the treatment of all fevers; that in very many cases supervision was alone required, and that in others a stimulant plan was necessary; the only question being the quantity of alcohol required and the time when it was needed. He thought, therefore, that those who spoke of their success by the universal treatment by alcohol in all cases of fever, were adopting (to say the least) a very unscientific method, which was, in reality, one founded on such a reasoning as this: That severe cases of fever are benefited by alcohol, and mild ones are not killed by it, and, therefore, it is safer to give it to all. The same may be said of those who declare carbonate of ammonia to be the *remedy* for all cases of scarlatina. It is, no doubt, of great value in severe cases, and in mild ones it certainly will not kill the patient. Dr. Wilks would not say, however, that wine and spirits did no harm, for in some cases he believed they were decidedly injurious, especially in young persons with typhus fever and violent delirium. He had such a case under his care, in which he ordered cupping to the back of the neck, and which was followed by quiet and sleep. He was a total disbeliever in the change of type theory; for such a case as this, and two others which he had seen bled, and yet did well, entirely refuted such an opinion. Although he believed the present plan of treatment by support saved more lives, he was quite sure, that if no stimulants were given, and that if the patients were bled, the greater number would recover as heretofore.—*Med. Times & Gaz.*

TREATMENT OF DYSENTERY BY LARGE DOSES OF IPECACUANHA.—This plan of treatment was introduced, or brought prominently forward, by Dr. Docker, of Mauritius. The use of ipecacuanha in dysentery is by no means novel; but the employment of such large doses, and in the method described, is (Dr. Hillier said) of comparatively recent date. The plan is to give a drachm of tincture of opium, to apply a mus-

tard plaster over the epigastrum, and, in twenty minutes, to give a drachm or a drachm and a half of powdered ipecacuanha in a very small quantity of peppermint water, or simple water. Sometimes half an ounce or an ounce of castor oil is given, with half a drachm of laudanum, before beginning the special treatment; this is, however, usually found to be unnecessary. Vomiting is not often induced, and the cure is often immediate. A patient may be passing, every half hour or oftener, blood and mucus, or bloody serum with pus. They cease at once for about twenty-four hours; he then has a natural stool, and is well. The diet is farinaceous.

In May, 1862, Mr. Baylis, of Ceylon, wrote to Dr. Hillier that he had treated fifty or sixty cases in this way, and only lost three, who were in articulo mortis when they came under his care.

Dr. Hillier has had the opportunity of trying this mode of treatment at the Children's Hospital. It was in the case of a child, aged 4 years, suffering from sub-acute dysentery contracted in Barbadoes. He gave five minims of laudanum, and, in half an hour, fifteen grains of powdered ipecacuanha. There was no nausea or any unpleasant symptom caused by the medicine; and although the patient had previously passed five or six motions, containing much blood and mucus, every twenty-four hours, there was no evacuation for thirty-six hours. He then passed an ordinary feculent motion, and from that time he continued quite well. It is stated that ipecacuanha has the effect of rapidly healing large dysenteric ulcers. Dr. Hillier suggested that it might be worth while to try it in the diarrhea dependent on tubercular ulceration, or in typhoid fever. The opium is supposed to act mainly in preventing vomiting, but it may, with ipecacuanha, have a more specific action on the disease.—*Ibid.*

VITAL STATISTICS OF BOSTON.
FOR THE WEEK ENDING SATURDAY, MARCH 19th, 1864.
DEATHS.

					Males.	Females.	Total.
Deaths during the week					37	47	84
Ave. mortality of corresponding weeks for ten years, 1853—1863,					41.3	36.3	77.6
Average corrected to increased population					00	00	85.27
Death of persons above 90					0	0	0

Mortality from Prevailing Diseases.							
Phthisis.	Croup.	Scar. Fev.	Pneumon.	Variola.	Dysentery.	Typ. Fever.	Diphtheria.
13	5	5	2	2	1	1	0

DIED.—In Louisville, Ky., March 19th, Joshua Barker Flint, M.D., Prof. of Surgery in the University of Louisville. The deceased was a native of Massachusetts, and a graduate of Harvard University of the class of 1820.

DEATHS IN BOSTON for the week ending Saturday noon, March 19th, 84. Males, 37—Females, 47.—Accident, 2—anæmia, 1—aneurism of aorta, 1—apoplexy, 1—disease of the brain, 4—inflammation of the brain, 1—bronchitis, 1—burns, 2—cancer, 1—consumption, 13—convulsions, 3—croup, 5—debility, 1—dropsy, 2—dropsy of the brain, 2—drowned, 1—dysentery, 1—erysipelas, 2—scarlet fever, 5—typhoid fever, 1—hemorrhage, 1—disease of the heart, 3—infantile disease, 1— influenza, 1—disease of the kidneys, 1—laryngitis, 3—disease of the liver, 2—congestion of the lungs, 2—inflammation of the lungs, 2—malaria, 1—paralysis, 1—phlebitis, 1—pleurisy, 2—premature birth, 1—puerperal disease, 1—purpura, 1—smallpox, 2—disease of the spine, 1—suicide, 1—syphilis, 1—tumor of the intestines, 1—unknown, 2—disease of the uterus, 2.

Under 5 years of age, 29—between 5 and 20 years, 12—between 20 and 40 years, 16—between 40 and 60 years, 18—above 60 years, 9. Born in the United States, 64—Ireland, 16—other places, 4.